

### **I. Amendments to the Claims**

The listing of claims below will replace all prior versions and listings of claims in the application.

The invention claimed is:

1. (Currently Amended) A parametric model-based computer implemented method for customizing an ablative surgical algorithm for use in refractive ophthalmic surgery, comprising:

receiving, with a data receiver of a computer, pre-perturbation data concerning a cornea on which a refractive ophthalmic surgery will be performed, wherein pre-perturbation data is data acquired before a pre-operative perturbation of the cornea;

receiving, with a data receiver of the computer, post-perturbation data concerning the cornea on which the refractive ophthalmic surgery will be performed, wherein post-perturbation data is data acquired after a pre-operative perturbation of the cornea;

accessing, with a processor of the computer, a parametric model stored in a computer readable medium, the parametric model storing one or more correlations between corneal data and predicted post-operative results; and

~~selecting, with a processor of the computer, an ablative surgical algorithm stored in a computer readable medium for use in the surgery, the selection based on one or more correlations between the pre perturbation data and predicted post operative results, one or more correlations between the post perturbation data and predicted post operative results, or combinations thereof; and~~

selectively updating, with a processor of the computer, ~~the selected~~an ablative surgical algorithm stored in a computer readable medium, the updating based, at least in part, on the one or more correlations between post-operative results and one or more of the pre-perturbation data and the post-perturbation data;

wherein the updated surgical algorithm is customized for the cornea on which a refractive ophthalmic surgery will be performed.

2 - 6. (Cancelled)

7. (Previously Presented) The method of claim 1, wherein the pre-perturbation data received comprises one or more of topographic data, pachymetric data, elevation data, corneal thickness data, corneal curvature data, corneal acoustic response and ultrasonic data, wave front data, intraocular pressure data, peripheral stromal thickness data, age data, sex data, contact lense data, prior surgical response data, patient visual acuity and visual performance data.

8. (Previously Presented) The method of claim 1, wherein the post-perturbation data received comprises one or more of topographic data, pachymetric data, elevation data, corneal thickness data, corneal curvature data, corneal acoustic response and ultrasonic data, wave front data, flap thickness data, intraocular pressure data, peripheral stromal thickness data, age data, sex data, contact lense data, prior surgical response data, patient visual acuity and visual performance data.

9 - 23. (Cancelled)

24. (Previously Presented) The method of claim 50 implemented in a system for updating the parametric model, comprising:

    a data receiver for receiving at least one of the pre-perturbation data, the post-perturbation data, a post-ablation data concerning the cornea on which the refractive ophthalmic surgery was performed, and a patient visual performance data concerning the cornea on which the refractive ophthalmic surgery was performed; and

    a data integrator that selectively updates the parametric model based, at least in part, on at least one of, the pre-perturbation data, the post-perturbation data, the post-ablation data, and the patient visual performance data.

25. (Currently Amended) The method of claim 1, wherein updating of the ablative surgical algorithm is based on the pre-perturbation data and one or more correlations between the pre-perturbation data and one or more ~~predicted~~ post-operative results.

26. (Previously Presented) The method of claim 7, wherein the pre-perturbation data received is acquired by one or more of corneal topography, optical coherence tomography, wave front analysis, ultrasound, and patient interview.

27. (Previously Presented) The method of claim 8, wherein the post-perturbation data received is acquired by one or more of corneal topography, optical coherence tomography, wave front analysis, ultrasound, and patient interview.

28 - 33. (Cancelled)

34. (Currently Amended) The method of claim 1 implemented in a computer data signal embodied in a transmission medium, comprising:

a first set of instructions for receiving corneal data selected from one or more of the pre-perturbation data and the post-perturbation data;

a second set of instructions for ~~selecting~~selectively updating an ablative algorithm based upon one or more correlations between the corneal data and a ~~predicted~~ post-operative result, the correlations being stored in a parametric model and associated with suggested adaptations to the ablative algorithm; and

a third set of instructions for updating the ablative algorithm based on the corneal data and the one or more correlations

35 - 37. (Cancelled)

38. (Currently Amended) The method of claim 1, comprising:

storing in a memory of a laser eye surgery apparatus an ablation program that controls a laser of the apparatus for ablating corneal tissue;

storing in the memory corneal data selected from one or more of the pre-perturbation data and the post-perturbation data;

storing in the memory the parametric model that stores a correlation between the corneal data and the ~~predicted~~ post-operative result;

adapting with a processor of the apparatus the ablation program based on the correlation; and

storing in the memory the adapted ablation program.

39. (Cancelled)

40. (Currently Amended) A computer readable medium storing computer executable instructions operable to perform computer executable portions of ~~the a method of claim 1 for customizing an ablative surgical algorithm for use in refractive ophthalmic surgery, comprising:~~

receiving, with a data receiver of a computer, pre-perturbation data concerning a cornea on which a refractive ophthalmic surgery will be performed, wherein pre-perturbation data is data acquired before a pre-operative perturbation of the cornea;

receiving, with a data receiver of the computer, post-perturbation data concerning the cornea on which the refractive ophthalmic surgery will be performed, wherein post-perturbation data is data acquired after a pre-operative perturbation of the cornea;

accessing, with a processor of the computer, a parametric model stored in a computer readable medium, the parametric model storing one or more correlations between corneal data and post-operative results; and

selectively updating, with a processor of the computer, an ablative surgical algorithm stored in a computer readable medium, the updating based, at least in part, on one or more correlations between post-operative results and one or more of the pre-perturbation data and the post-perturbation data;

wherein the updated surgical algorithm is customized for the cornea on which a refractive ophthalmic surgery will be performed.

41. (Currently Amended) A system for updating an ablation algorithm for customizing refractive ophthalmic surgery, comprising:

a data receiver for receiving pre-perturbation data and post-perturbation data, or both, concerning a cornea on which a refractive ophthalmic surgery will be performed;

a computer readable medium having stored thereon a parametric model for storing correlations between one or more of the pre perturbation data, the post perturbation data, and a predicted corneal data and post-operative results, the correlations being associated with suggested adaptations to ablative algorithms; and

a processor for (i) selecting an ablative algorithm for use in the surgery based on one or more of the correlations stored in the parametric model and (ii)selectively updating the ablation algorithm based, at least in part, on one or more correlations between post-operative results and one or more of the pre-perturbation data, and the post-perturbation data, and the one or more correlations.

42. (Previously Presented) The system of claim 41, wherein the data receiver is adapted to receive corneal data selected from one or more of corneal acoustic response and ultrasonic data, patient visual acuity and visual performance data, topographic data, pachymetric data, elevation data, corneal thickness data, corneal curvature data, wave front data, intraocular pressure data, flap thickness data, peripheral stromal thickness data, age data, sex data, contact lense data, and prior surgical response data.

43. (Previously Presented) The system of claim 54, wherein the corneal data is acquired before a cornea is ablated, before a cornea is cut, before a cornea is scraped, or before a corneal epithelial layer is peeled.

44 - 45. (Cancelled)

46. (Previously Presented) The system of claim 54, wherein the corneal data is acquired after a cornea is cut, after a cornea is ablated, after a cornea is scraped, or after a corneal epithelial layer is peeled.

46. - 49. (Cancelled)

50. (Previously Presented) The method of claim 1, comprising ablating corneal tissue from a cornea in accordance with the updated corneal ablative algorithm.

51. (Currently Amended) The method of claim ~~425~~, wherein updating of the ablative surgical algorithm is based on the post-perturbation data and one or more correlations between the post-perturbation data and one or more ~~predicted~~ post-operative results.

52. (Cancelled).

53. (Currently Amended) The method of claim 1, wherein updating of the ablative surgical algorithm is based on (i) the pre-perturbation data and one or more correlations between the pre-perturbation data and one or more ~~predicted~~ post-operative results; and (ii) the post-perturbation data and one or more correlations between the post-perturbation data and one or more ~~predicted~~ post-operative results.

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54. (Previously Presented) The system of claim 42, wherein the corneal data is acquired by one or more of corneal topography, optical coherence tomography, wave front analysis, ultrasound, and patient interview.